



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> <b>PCT/US99/28997</b> <b>(22) International Filing Date:</b> <b>7 December 1999 (07.12.99)</b> <b>(30) Priority Data:</b> <b>98870270.0 14 December 1998 (14.12.98) EP</b> <b>(71) Applicant (for all designated States except US):</b> THE PROCTER & GAMBLE COMPANY [US/US]; One Procter & Gamble Plaza, Cincinnati, OH 45202 (US). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> VAN GEERT, Peter, Maurits, Maria [BE/BE]; Potaardestraat 75, B-1950 Kraainem (BE). ETE SSE, Patrick, Jean-François [FR/BE]; Boulevard Louis Schmidt 63, B-1040 Brussels (BE). <b>(74) Agents:</b> REED, T., David et al.; The Procter & Gamble Company, 5299 Spring Grove Avenue, Cincinnati, OH 45217-1087 (US).		<b>(81) Designated States:</b> AE, AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), DM, EE, EE (Utility model), ES, FI, FI (Utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SI, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>
<b>(54) Title:</b> DUPLEX HOLOGRAPHIC FILM <b>(57) Abstract</b> <p>The present invention relates to an holographic structure comprising an organic solvent based embossed layer, a metallic layer located onto the embossed layer, and an organic solvent based printing ink layer characterised in that the printing ink layer and the metallic layer are solely separated by a water solvent based primer.</p>		

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## DUPLEX HOLOGRAPHIC FILM

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### Technical field

The invention relates to a film structure for a holographic film.

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### Background of the invention.

Holographic films are used more and more widely, particularly in the packaging of consumer goods. In an holographic structure, an embossed layer is covered with a metallic layer. This has the advantage of providing a three dimensional structure effect which is catching to the eye. However, this often requires redesign of the whole film structure, particularly due to the fact that the metallic layer is not a thermo-plastic layer but a thin metallic layer.

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The present invention concerns an holographic structure comprising an organic solvent based embossed layer, a metallic layer located onto the embossed layer, and an organic solvent based printing ink layer.

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Among the advantages of such a structure is the eye-catching effect which can be obtained by the combination of holographic techniques and the holographic techniques.

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While having this and other advantages, such structures, particularly when integrated into laminated film structures, have

disadvantages. For example, a typical film structure will comprise the organic solvent based lacquer printed or applied, prior to embossement, onto a first side of a polyester (PET) film, typically a 12µm thick film. Once this lacquer is applied to this PET film, it is embossed so as to produce the holographic pattern. Once embossed, a metallic layer, typically aluminium, is vaporised or applied in another manner onto the embossed lacquer to form the "holographic core". The PET side which is not covered by the embossed lacquer can be thereafter laminated to other films, for example a 180 µm thick PE poly-ethylene film. Once this is done, printing can occur. However, it was found that direct printing onto the metallic layer was leading to dissolution of the embossed layer by penetration of the ink solvents through the thin metallic layer.

However, all these film structure are showing dissolution of the embossed lacquer due to ink solvent going through the metallic layer.

The invention seeks to provide an holographic structure of the above mentioned kind which does not lead to dissolution of the embossed lacquer.

#### Summary of the invention

In accordance with the invention, this object is accomplished in a holographic structure of the above mentioned kind in that the printing ink layer and the metallic layer are solely separated by a water solvent based primer.

A process in accordance with the invention has a number of advantages. Since the metallic layer and the printing ink layer are

separated by the water solvent based primer, migration of the organic solvent from the ink layer to through the water solvent based primer is prevented, as the organic solvent was found not to migrate through a water solvent layer. Therefore, dissolution of the embossed lacquer by migration of the organic solvent present in the ink layer is avoided.

#### Detailed description of the invention

The invention relates to an holographic structure. By an holographic structure, it should be understood that the structure is exhibiting a three dimensional eye-catching impression based on the metallisation of an embossed layer. Indeed, according to the holographic structure comprises an organic solvent based embossed layer. By organic solvent based, it should be understood that the layer is applied together with a solvent, for example by a printing technique, the solvent being organic. The layer is embossed by processes already known by the man skilled in the art of making holograms. Typically, embossement is obtained by application of a pressure onto the layer, so as to produce the pattern which will exhibit the holographic effect. This holographic effect is produced in combination with the metallic layer located onto the embossed layer. Typically, this metallic layer is an aluminium layer, which is applied by vaporisation, thereby giving a thickness of a few atomic layers. Further, the holographic structure comprises an organic solvent based printing ink layer. This layer may comprise one or more inks having various colours, these being typically applied by the usual printing techniques together with a solvent, which is an organic solvent in the structure of the invention. It should be mentioned that an organic solvent should be understood as being non aqueous. Additionally, the printing ink layer and the metallic layer

are solely separated by a water solvent based primer. By solely separated, it should be understood that no laminated layers are to be found between the printing ink layer and the metallic layer. It is necessary that the primer is water-based so as to prevent migration of the solvent from the inks into the embossed layer through pin-holes which usually are present in the thin metallic layer. Indeed, migration of organic solvents through the metallic layer was found to dissolve the embossed layer. It should be understood that the primer could comprise several layers itself, although such layers should not be laminated but applied together with a water based solvent.

In a preferred embodiment, the embossed layer is formed from a lacquer applied to a thermoplastic film, the thermoplastic film being preferably a poly-ethylene-terephthalate film. In a more preferred embodiment, this thermoplastic film is laminated to another thermoplastic film, such as a polyethylene film for example.

In the most preferred embodiment according to the invention, the embossed layer is an acrylic based lacquer which is deposited on a 12  $\mu\text{m}$  polyester film using toluene, butyl acetate or ketones as an organic solvent. This embossed layer is thereafter covered with an aluminium layer, which is itself covered with the water solvent based primer which is an aqueous based acrylic, as in a preferred embodiment whereby the water solvent based primer comprises acrylic compounds. The primer is therefore forming a barrier to the migration of the organic solvents comprised in the printed ink layer which is applied onto the primer. In this most preferred embodiment, a white ink and colored inks are printed, the white ink having an ethyl-acetate solvent and the coloured inks having an ethanol solvent. Indeed it was found preferable to

use different organic solvents for the ink in order to avoid dissolution of a first ink when a second ink is applied. Indeed, in a preferred embodiment, the printing ink layer comprises a coloured ink and a white ink, the coloured ink having ethanol as an organic solvent and the white ink having ethyl-acetate as an organic solvent. A two-components lacquer is then applied onto the printed ink layer to protect the ink. The side of the PET film which is not covered by the embossed layer is then laminated to a 180  $\mu\text{m}$  polyethylene film. A package made from this film laminate comprising an holographic structure according to the invention allows to avoid dissolution of the embossed layer while maintaining the holographic appearance. Further, this package revealed to be suitable for use as a refill pouch for laundry product when made according to the process described in EP626319. Further, this package can be used to contain up to 3 liters of liquid laundry product, filling occurring at normal production speed, without need for an enlarged head space as would be needed in case of a thicker and more rigid film. Another package is foreseen, whereby each side of the film is made from a thermoplastic material. This may be achieved by applying an extra thin layer of polyethylene, such that both sides of the film could be thermo-sealed. Such a package is particularly well suited for granules laundry products packaging.

## WHAT IS CLAIMED IS:

1. An holographic structure comprising an organic solvent based embossed layer, a metallic layer located onto the embossed layer, and an organic solvent based printing ink layer characterised in that the printing ink layer and the metallic layer are solely separated by a water solvent based primer.
2. A structure as in claim 1, whereby the embossed layer is formed from a lacquer applied to a thermoplastic film.
3. A structure as in claim 2, whereby the thermoplastic film is a polyester film.
4. A structure as in claim 2, whereby the thermoplastic film is laminated to another thermoplastic film.
5. A structure as in claim 1, whereby the metallic layer is an aluminium layer.
6. A structure as in claim 1, whereby the embossed layer is an acrylic based lacquer.
7. A structure as in claim 1, whereby the printing ink layer comprises a coloured ink and a white ink, the coloured ink having ethanol as an organic solvent and the white ink having ethyl-acetate as an organic solvent.
8. A structure as in claim 1, whereby the water solvent based primer comprises acrylic compounds.



9. A package made from a film laminate comprising an holographic structure as in claim 1.

5 10. A package as in claim 9, whereby each side of the film is made from a thermoplastic material.

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 99/28997

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B29C59/02 B42D15/10 G03H1/02 B65D33/00 B44F1/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B29C B42D G03H B65D B44F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 319 475 A (KAY RALPH ET AL) 7 June 1994 (1994-06-07) column 2, line 66 -column 3, line 8 column 4, line 6 - line 63 column 5, line 37 -column 6, line 8 column 7, line 50 -column 8, line 49 column 11, line 17 -column 12, line 19	1-6,8-10
X	WO 93 16888 A (DE LA RUE HOLOGRAPHICS LTD) 2 September 1993 (1993-09-02) page 3, line 21 - line 33 page 7, line 13 -page 8, line 1 page 14, line 1 -page 15, line 4	1-6,8
	-/-	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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